GAS JOURNAL, SEPT. 13, 1939

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Editorial Notes

The "Journal's" Part in War

DISPERSAL of the population is relied upon as a means of minimizing the effects of attack from the air, and cancellation of meetings of technical bodies has taken or is taking place. It would indeed be a serious matter for the country if disaster fell on any large body of gas engineers, representing the ablest brains in the Industry, while in conference. But now more than ever is it desirable that there should be full interchange of technical information in the Industry, and it is here that the "GAS JOURNAL" can and will play its part. We shall do all possible to give each week a first-class news service and a first-class technical information service. To ensure this wholly necessary interchange of views we must to a large extent rely on readers to send us items, technical and otherwise, for publication. We ask for co-operation in this regard and that gas engineers should look upon the "JOURNAL" as a clearing house of ideas, as a central bureau, as a substitute for the informal conversations which were so valuable a feature of peace-time meetings.

We are, of course, in the closest touch with the Industry's central organizations and are aware of the vast amount of work which has been thrust upon them by the outbreak of hostilities. We know, too, how efficiently this work is being tackled and how the many complicated problems are being smoothed out. The national bodies are, in fact, settling down admirably to war-time conditions, and gas undertakings can feel assured that their interests are being very well watched and safeguarded. Their interests could not be in more capable hands, and each undertaking can look for and receive help and guidance on questions whether legal, administrative, or technical. An example of technical assistance is the memorandum on the recovery of benzole and toluole from gas under emergency conditions.

As far as the manufacturers of gas-making plant and gas-using equipment are concerned, we know they are determined that everything shall be done towards maintaining continuity under war conditions of that service to gas undertakings which has characterized their operation during peace. Indeed, in whatever direction one looks one finds within the Gas Industry co-operation towards a common end. As we have said, the "JOURNAL" will spare no effort in bringing together the various interests in the Gas Industry and disseminating essential news and information. In our efforts to uphold a tradition of usefulness extending over very many years we look to the Industry for consideration and tolerance of any shortcomings in the difficult transitional period between normal and war-time conditions and to the support alike of reader and advertiser.

Problems Ahead

THAT the war will bring vast changes to the Gas Industry and present many problems goes without saying. More than ever now do we need co-operation among gas undertakings, among all concerned with gas manufacture and supply. The street lighting load, which represents a considerable proportion of the Industry's output, has disappeared for the time being. Evacuation from the vulnerable areas to rural districts will mean loss of load to the gas undertakings in the vulnerable areas and unprecedented demands on those undertakings in the safety zones. Then there is rationing of gas and coke used for domestic and small industrial purposes. At the moment the limit is fixed at 75% of the quantity consumed in the corresponding quarter of the year ended June 30, 1939. Consumers will not be rationed below 100 therms of gas and 2 tons of coke per annum. Provision will have to be made to cover an increase in the number of occupants of premises arising from evacuation arrangements. Enforcement of the provisions of the Fuel and Lighting Order will need a good deal of machinery and will add to the clerical work of gas undertakings.

In the meantime, gas undertakings' staffs are being depleted by the call to the Colours—and many in the Industry will feel the urge to offer themselves for active service. Coupled with this, air raid precaution work is occupying much of the time of staffs who would otherwise be engaged in their normal duties. Undertakings in the non-vulnerable areas are working under severe strain. Large country houses well away from gas mains are packed to overflowing with evacuees, and urgent demands are being made for gas supplies. These demands will be met, if not at the twinkling of an eye. Works capacity and mains capacity will have to be increased, and the vexed question of adequate coal supplies will have to be answered without delay. The Gas Industry will face up to all the demands made upon it, but its claims must be properly recognized and the restrictions imposed upon it must be reasonable.

It is particularly important that it should be assured of adequate personnel to carry on efficiently an Industry of first national importance in the supply of heat to domestic premises and to industry, and in the supply of raw material for the manufacture of explosives and of benzole for motor transport. During the last war the Industry was of inestimable service to the nation, but it is in a position to-day to render greater and

more widespread service. The present and future national demands require the retention in the Industry of a sufficiency of men who are trained technically to control gas-works plant and operate recovery plant to the best advantage, and they require also the retention of a sufficiency of skilled research workers, who will be called upon to investigate problems of war-time nature. The Industry has in its ranks men who will be indispensable in the development of new processes to meet war-time requirements, and it has to be remembered that the efficacy of the Forces depends on the efficiency of supply of the materials they need. It requires little thought to visualize the enormous potentialities of the Gas Industry for service in these dark days. It can provide the ideal fuel for the heat treatment of materials used for armaments, it can provide motor spirit, toluole for explosives, and in gas there is a substitute for imported petrol. Its work must go on and must be safeguarded.

Research and Service

The changed conditions will, of course, necessitate an entirely new outlook by the Gas Industry in regard to what subjects, in the circumstances, should be, and what questions for the time being should not be, a matter for research. This, we suggest, is hardly a propitious time for carrying through the Gas Research Board scheme with its Director of Research. There will, however, be work in plenty for The Institution of Gas Engineers to do in collaboration with the Society of British Gas Industries; and we see that the need now is more urgent than ever for the setting up of a central information bureau. Undertakings throughout the country will be in need of advice and guidance on technical matters, and the Institution is the body to set the necessary machinery in motion. Also, the Industry during recent years has fostered a close association with the Fuel Research Board, and, indeed, much useful investigational work has been carried out jointly by the Institution and the Board. This happy co-operation will stand the Industry and the nation in good stead in the times ahead. Then, of course, apart from research, the Institution will have to organize itself on a war-time footing to be able to cope quickly with the various problems as they arise.

And now we come to that vital question of service. The public has been led to expect a very high standard from the Gas Industry in this regard, and after any immediate difficulties have been overcome the aim should be to maintain this high standard. After there has been a settling-down to war-time conditions the consumer, wherever he may be, will again compare the services rendered respectively by gas and electricity, and as far as generation and distribution are concerned electricity is far and away more standardized than gas, and the supply is interlinked, so that failure at one generating station may not necessarily mean failure of supply to the public while the damage is being repaired. More interconnecting of supply may have to be carried out by the Gas Industry, and in this regard we are up against the variation in declared calorific values and other characteristics of the gas supplied by different and adjacent undertakings. In peace-time we have urged a greater measure of uniformity in this direction, planned, if need be, on a regional basis. The need for further uniformity appears to us to be emphasized by the conditions which are likely to obtain as the war progresses.

And our remarks in regard to gas service apply with equal force to the coke market. Most undertakings—not all—have of recent years been at pains to produce and market a solid smokeless fuel graded satisfactorily for the various purposes to which it is put. This attitude towards the coke market should be maintained in face of difficulties, for the production of benzole implies that more coke will be made relative to the amount of gas available for distribution. It may be that more consideration will have to be given to the production of a coke which can be burned satisfactorily in the ordinary open fire-grate as distinct from the special coke grate.

These, then, are a few of the problems which spring to the mind in contemplating the activities of the Gas Industry in time of war. There will be many difficulties, but the Industry has more resources at its command than ever before, and it has all that determination, will to win through, and desire to be of national service in very many directions which are part of its long and admirable tradition.

The Problem of Dividends

Every one of us is likely to be assailed by problems in the coming days which will require for their solution something additional to the robust faith in the justice of our cause that is shared by all. "Business as usual," which was the cry of 1914, though obviously impossible of complete attainment, was an excellent goal to strive towards; and it would seem to be so also in 1939. While it cannot be expected that dislocation will be avoided now, any more than was the case then, economic aspects of the war will be at least as important, and any unnecessary "upheaval" in this direction might prove unfortunate. One of the problems which will confront the boards of industrial concerns is the dividend policy which it will be wisest to follow in the present emergency No one course could be suggested that would best fit every case, so varied are the circumstances of different businesses. There are numerous factors which must be weighed-up by individual boards, but generally speaking the *Financial Times* is doubtless correct in remarking that the boards of industrial concerns must be under considerable temptation in present circumstances to delay or pass dividend payments. "It is only natural," says our contemporary, "when the nation is adjusting its economy to a war basis, and when it is evident that there must be vast changes in the earning power and activity of various industries, that there should be a tendency to conserve working capital. It is not difficult to sympathize with those responsible for the direction of a company's affairs who are inclined to pursue a policy of ca'canny until the future shape of our economic life becomes a trifle clearer. At the same time, it is essential that the economic machine should not be retarded for want of fuel. And one of the most important constituents of its fuel is the dividend flow. . . . By making the most generous dividend payments which are compatible with their current financial positions and future trading probabilities, industrial concerns can make an all-important contribution to the smooth functioning of the nation's economy in war time. Only thus can an important part of the national savings be made available for the prosecution of the war."

A Versatile Fuel

We have described from time to time in the columns of the "JOURNAL" many interesting and unusual applications to which gas heating has been put—applications whereby the vagaries of our English climate may be overcome. Carrying this even one stage further, we refer on later pages of this issue to a gas heating installation which provides, automatically, temperature and humidity conditions consistent with tropical regions for the purpose of housing and rearing a very fine collection of overseas birds, orchids, and other exotic plants. In this particular instance the great value of the birds necessitated very careful calculations to ensure that the exacting high temperatures would be maintained throughout the year. Including the domestic heating system, no fewer than sixteen Potterton gas-fired boilers, representing a maximum hourly consumption of 3,770 cu.ft., have been fitted in this interesting installation at Englefield Green.

The main range of 41 aviaries are divided into nine sections, each independently heated by a gas boiler controlled by air and immersion type thermostats to maintain a temperature of 70° F. during the winter months. The same consideration has been given to the orchid houses, where subdued light, humidity, and heat are essential. Here again, gas boilers provide the necessary conditions for growing a thousand different varieties requiring different temperatures at successive stages of cultivation—some being content with 60° to 65° while others demand 75° to 80°. It is a welcome tribute to the versatility of gas that the owner has expressed entire satisfaction with the operation of this extensive heating system, and it is no less gratifying to learn that the cost of running the plant, in the sections where it has been possible to make comparisons, is little, if any, more than that of the anthracite previously used.

News of the Week

The Technical Committee Meeting of the London and Counties Coke Association arranged for Sept. 19 has been cancelled; but the meetings of the Finance, Executive, and Central Committees arranged for Sept. 18 remain unaltered.

The Autumn Meeting of the North of England Gas Managers' Association, which was to have been held at Malton on Friday, September 22, has been indefinitely postponed in view of the international situation.

To Modernize the coal transport facilities, the Peterborough Gas Company have introduced a new 6-ton Scammell mechanical horse, which operates five converted trailers, each carrying six tons of coal. The new equipment is proving very successful.

In the Competition organized by the Ashton-under-Lyne Gas Company and the Mossley Gas Company in which competitors were asked to place the features of the new gas cookers in order of importance, the correct order is: (1) Reliability; (2) automatic oven with cookery book; (3) economy in gas consumption; (4) easy-to-clean enamel finish; (5) super-speed boiling burners; (6) high-speed griller; (7) modern design folding cover; (8) bright colourful appearance. There were two prizes of £3 each, which have just been presented to the winners.

Burntisland Town Council has agreed to increase the price of gas by 3d. per 1,000 cu.ft., making the rate 3s. 7d. per 1,000 cu.ft. to ordinary meter consumers and 4s. per 1,000 cu.ft. through prepayment meters.

Experiments with Subdued Illumination of closes and stairheads in tenements in Glasgow are being carried out by the Director of Lighting of Glasgow Corporation. The Emergency Committee and the military authorities are to inspect several methods of dimming the lights, and it is expected that one of the devices will be approved for general adoption.

The Institution of Mechanical Engineers is carrying on the bulk of its work at a temporary address in the country, The Meadows, Betchworth, Surrey (Telephone: Betchworth 63), but the Institution building in Storey's Gate will remain open, possibly during restricted hours, for dealing with personal enquiries and for members or others wishing to make use of the Library. The majority of the members of the Institution are engaged upon work of national importance or are serving in technical branches of H.M. Forces, and some 6,000 have offered their services through the Central Register of the Ministry of Labour.

Personal

Mr. W. J. BAKER, M.Inst.GasE., A.M.I.Mech.E., A.M.I.Chem.E., has been appointed Deputy Engineer and Works Manager to the Bristol Gas Company. For the past eight years, Mr. Baker has been Engineer and Manager to the Shanghai Gas Co., Ltd. He returned to England in May of this year.

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Mr. R. W. PEARCE, Deputy Inspector at the City of Nottingham Gas Meter Testing Station since 1936, has tendered his resignation upon securing the appointment of Assistant Inspector and Deputy Gas Examiner for the City of Exeter.

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Mr. SYDNEY ASHWORTH has been appointed Assistant Engineer to the Darwen Corporation Gas Department.

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Estate valued at £85,914 (n.p. £85,042) was left by Mr. FREDERICK C. TILLEY, Chairman of Peebles & Co., Ltd., Managing Director of Tilley Bros., Ltd., Hendon, and Chairman of the Tilley Lamp Company. Subject to various legacies, he left the property between his children.

Obituary

Sir Paul Makins

Sir PAUL AUGUSTINE MAKINS died on Sept. 9 at Eaton Mansions, S.W., at the age of 68. He succeeded his father, Col. Sir William Thomas Makins, M.P., as second baronet in 1906, and was educated at Eton and Trinity College, Cambridge. A former High Sheriff of Oxfordshire, he served during the war with the Remount Service, of which he became Superintendent in 1917. Sir Paul was Vice-Chairman of Glover and Main and its subsidiary companies.

Women's Gas Council

Manchester Branch

The Organizer of the Manchester Branch of the W.G.C. (Miss M. M. Robinson) has issued the following letter to members:

"It is with much regret that I have to tell you that all Women's Gas Council activities are suspended, as naturally under the present conditions it is not advisable to hold meetings, but I sincerely hope that very soon things will return to normal, so that we can once again resume our happy associations.

"In the meantime, as always, the Gas Department is at your service, and the "Home Service" Section will be only too glad to give you help and advice, including information in regard to A.R.P., especially in connexion with food storage, economical menus, and the blacking out of windows and doors, so please do not hesitate to write, telephone or call if there is any service we can render.

"As we can no longer have collective meetings, I hope if you are in town, you will call at the Gas Showrooms, where we shall always be pleased to see you."

Forthcoming Engagements

Sept.

15.—I.G.E.—Council of Gas Research Board.

18.—L.C.C.A.—Finance Committee, 10.45 a.m.; Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.

19.—I.G.E.—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.; Gas-Works Safety Rules Committee, 2.30 p.m.

21.—S.B.G.I.—Council Meeting, 11.15 a.m.

21.—I.G.E.—Refractory Materials Joint Committee, 2.30 p.m. (at Stoke-on-Trent).

29.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.30 a.m.; Joint Research Committee, 2.30 p.m.

Oct.

3.—I.G.E.—Research Executive Committee, 2.30 p.m.

6.—I.G.E.—Joint Committee on Complete Gasification under Pressure, 14, Old Queen Street, S.W. 1, 3 p.m.

9.—I.G.E.—Finance Committee, 1.45 p.m.; Membership Committee, 2.15 p.m.; General Purposes Committee, 3 p.m.; Benevolent Fund Committee of Management, 4.30 p.m.

10.—I.G.E.—Council, 10 a.m.

11.—I.G.E.—Board of Examiners, 2.30 p.m.

17.—I.G.E.—Gas Education Executive Committee, 2.30 p.m.

26.—Coke Oven Managers' Association.—Annual Dinner, Hotel Victoria, W.C.2.

30.—L.C.C.A.—Annual General Meeting, May Fair Hotel, W.

South-Western Gas and Water Corporation, Ltd.

At a Board Meeting held on Sept. 7, in London, the Chairman of the Meeting made the following announcement:

"The future being so obscure, it should not be taken that the interim dividend of 2%, being the same as declared last year, is any indication of the final rate being maintained, but the Corporation's affairs are being handled on lines deemed to be appropriate in the special circumstances. The accounts for the six months ended June 30, 1939, show an improvement over the corresponding period of 1938."

Cancellation of B.C.G.A. District Conferences

The following District Conferences of the B.C.G.A. are cancelled, owing to the outbreak of hostilities and the Government prohibition of public meetings:

Sept. 26.—District Conference at Stroud.
Oct. 5.—South Wales District Conference at Neath.
Oct. 17.—Northern District Conference at West Hartlepool.
Oct. 25.—South Western District Conference at Taunton.

War Time Changes of Address

In addition to the list published in last week's "JOURNAL" we have been notified of the following changes of address relating to business houses, all of which apply until further notice:

Primitiva Gas Company of Buenos Aires, Ltd.
Primitiva Holdings, Ltd.
Province of Buenos Aires Gas Co., Ltd.
Buenos Aires Industrial Supply Co., Ltd.
All the above companies are now at "Cloverley," Park Hill, Loughton, Essex. 'Phone: Loughton 3540.

British Furnaces, Ltd. (London Office), E. J. Barlow, 29, Burlington Gardens, Chiswick, W.4. 'Phone: Chiswick 4791. Please communicate as much as possible with Head Office and Works at Chesterfield.

Bryan Donkin Co., Ltd. (London Office), C. W. Crawshaw, Esain Lodge, Streatham Common North Side, S.W.16. 'Phone: Streatham 3807; or B. I. Stone, 75, Perryn Road, Acton, W.3. 'Phone: Shepherd's Bush 4709. Please communicate as much as possible with Head Office and Works at Chesterfield.

Chemical Engineering and Wilkins Patent Furnace Co., Ltd., "Kingsmere," Parkfield Road, West Tarring, Worthing. 'Phone: Worthing 3785.

Arthur Docking & Co., 956b, Brighton Road, Purley, Surrey.

Foster, E. & Co. (Manchester Office), 9, Eagle Brow, Lymm, Cheshire. 'Phone: Lymm 104.

General Gas and Electricity Co., Ltd. (and all subsidiaries previously administered from 50, Cannon Street, E.C.4), 42 Foxgrove Road, Beckenham, Kent. 'Phone: Beckenham 2225.

Gibbons Bros., Ltd. (London Office), 1, Stanton House, St. Mark's Hill, Surbiton, Surrey. 'Phone: Elmbridge 2836. 'Grams: Giboyant, Surbiton.

Institute of Fuel, Stangrove Hall, Godstone, Surrey. 'Phone: Godstone 126.

Institution of Mechanical Engineers, "The Meadows," Betchworth, Surrey. 'Phone: Betchworth 63.

Radiation, Ltd., Advertising and Publications Department, 8, Sheet Street, Windsor, Berks. 'Phone: Windsor 212.

Roneo, Ltd., Hornchurch Road, Romford, Essex. 'Phone: Romford 1060.

Thames Coal Co., Ltd., "Barnhorn," Meadway, Berkhamsted, Herts. 'Phone: Berkhamsted 206.

West's Gas Improvement Co., Ltd., Bath Road, Harmondsworth Middlesex. 'Phone: West Drayton 2375.

South Suburban Company's Emergency Headquarters

In consequence of the state of emergency which has arisen, the South Suburban Gas Company have decentralized most of the offices formerly located at their Chief Office at Sydenham and also re-arranged the location of other offices.

Chief Office has moved to Leigh Court, Golden Green, near Tonbridge, and several departments, such as the Buying Department, have been moved to the Company's Orpington Office (Telephone No. Orpington 3840). The Engineer, Mr. V. Simmonds, is now located at the St. Mary Cray Works, St. Paul's Cray, Kent (Telephone No. Orpington 2660), while the Distributing Engineer, Mr. J. A. Gould, is operating from the Company's address at Worsley Bridge Road, Sydenham (Telephone No. Beckenham 5051).

So far as consumers' accounting is concerned, this has all been decentralized from Sydenham into the various local offices already existing throughout the area, which will now deal completely with all matters appertaining to service to consumers.

Gas Assists in Hythe Venetian Fete

The following paragraph appeared in a local paper relative to the recent Hythe Venetian Fete:

"Yet in spite of wars and rumours of wars the committee responsible for the Hythe Venetian Fete went ahead with their plans unperturbed, and on Wednesday they reaped the fruits of their labours in an enormously successful event. The stretch of canal along which the Fete took place looked extremely pretty with its festoons of coloured lights and its rows of big gas floodlights along each bank. The gas light gave a gentler touch to the trees than the somewhat harsh glare of the searchlights used last year."

Mr. G. Le B. Diamond, Engineer and General Manager of the Folkestone Gas and Coke Company, tells us that at the last moment the Fete Committee were faced with lighting difficulties in the loss of searchlights, and so they came to the Gas Company to help them out of their trouble. At two or three days' notice the Company were able to do this by fixing forty-nine flood lamps along the canal banks.

A.R.P. Notes

British Standards Specifications

The following is a full list to date of British Standard Specifications (A.R.P. series) available for civil defence purposes:

BS/ARP 1.—Aggregates for concrete shelters constructed *in situ*.
BS/ARP 2.—Bituminous paint and bituminous compound for the protection of steelwork.
BS/ARP 3.—Electric hand-lamps (fitted with primary battery or unspillable accumulator).
BS/ARP 4.—Apparatus for decontamination of oilskin clothing.
BS/ARP 5.—Chemical closets for use in shelter accommodation.
BS/ARP 6.—Shelter lighting (shelters for 50 persons (210 sq.ft.) or multiples thereof up to 200 persons).
BS/ARP 9.—Gas-proof cloth for rendering windows gas-proof and weatherproof after breakage.
BS/ARP 10.—Rubber gaskets for rendering doors and windows gas-tight.
BS/ARP 11.—Adhesive tape for fixing gas-proof material, repairing damaged material or sealing apertures and cracks, &c.
BS/ARP 12.—Petroleum jelly for sealing gas-tight doors, &c.
BS/ARP 14.—Black blind material for obscuring windows.
BS/ARP 15.—Light traps for shops.
BS/ARP 16.—Specific methods of providing even illumination of low intensity (.002).
BS/ARP 20.—Specific methods of providing even illumination of low intensity (.02).
BS/ARP 22.—Mixture for anti-gas cloth.

Copies of all the above Specifications are available, price 3d. post free, from the offices of the British Standards Institution, 28, Victoria Street, London, S.W.1, or from the Secretary of The Institution of Gas Engineers.

The following Specifications are in course of preparation and will shortly be published:

Electric lighting of control and report centres.
Wire netting for protection against flying glass from roof lights and windows.
Blanket felt for rendering doors and windows gas-proof and forming gas locks.
Electric lighting of air raid shelters (large).
Fluorescent paints.
Adjustable hinges.
Specific methods of providing even illumination of low intensity (.2).
Blind and curtain material (textile).

Special Lacquers for Light Suppression

The current issue of the *Ironmonger* refers to an interesting method whereby Donald Macpherson & Co., Ltd., of 21, Albion Street, Manchester, 1, have perfected a dual system of treating windows and light bulbs or globes for the suppression of light-emission from the windows and glass roofs of factories and similar buildings. Glass treated with special lacquers are translucent when held up separately to light—indeed, transparent—but are quite opaque when placed one over the other. One lacquer is a particular shade of blue and the other is a shade of amber. In practice the blue lacquer is applied to the windows or glass roofing and the amber to the light bulbs. Thus, during daylight ample light is admitted; but at night the lights can be turned on and yet remain invisible from outside. This method greatly simplifies compliance with regulations for war-time lighting restriction since it is easy to apply. The company also offer a special Foochow A.R.P. window-black which can be easily and speedily applied by brush or spray. The material, it is claimed, obliterates completely in one coating, thus preventing light-emission from factory windows, while it will keep for any length of time, and is ready for immediate use. Its covering capacity is approximately 80 sq.yd. per gallon.

British Commercial Gas Association

Publicity Campaign

In view of the outbreak of hostilities, it has been decided that the B.C.G.A. Gas Fire Fortnight and the Gas and Coke Campaigns, which had been arranged for the Autumn, shall be suspended. It is possible that the Association will be able, in the future, to issue certain announcements in the Press in the interests of the Gas Industry, and full particulars of these will be circulated when a decision is reached.

Film Library Service

In view of the Order forbidding all forms of Public Meetings, the British Commercial Gas Association Film Library Service and Road Show Service will be suspended until further notice.

W-D VERTICALS

ORDERS RECEIVED IN 1939

W-D Continuous Vertical Retorts

	Tons of coal per day		Tons of coal per day
■ ASCOT (3rd Installation)	23	■ LOUGHBOROUGH (3rd Instn.)	17
□ BIRKENHEAD	209	■ MELBOURNE Aust. (6th Instn.)	160
■ DONCASTER	193	■ PETERBOROUGH	133
■ EXMOUTH (2nd Installation)	36	■ TURIN (3rd Installation)	576
■ LISBON	177	□ WOLVERHAMPTON	137
■ WORCESTER	74		

W-D Intermittent Vertical Chambers

■ WESTON-SUPER-MARE (2nd Installation) - - - - 72

■ New Installation □ Complete Modernisation

Design Drawing for new Installation at Peterborough.

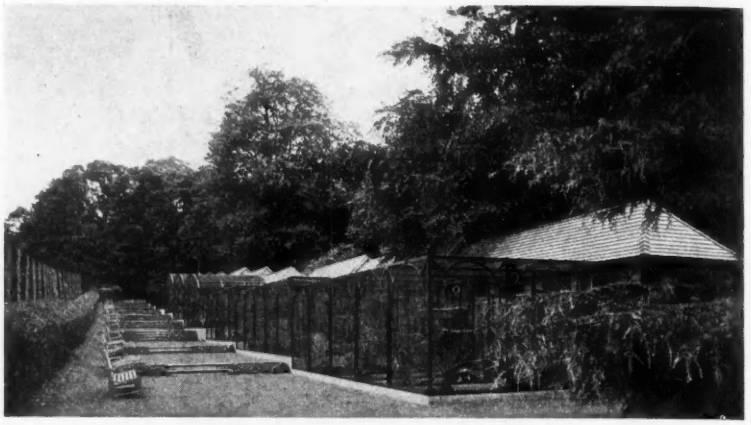
W-D

THE WOODALL-DUCKHAM VERTICAL RETORT & OVEN CONSTRUCTION CO. (1920) LTD.
EBURY HOUSE, 150 VICTORIA STREET, LONDON, S.W.1
TELEPHONE: VICTORIA 8631 (6 LINES) *Members of the Society of British Gas Industries* TELEGRAMS: "RETORTICAL, SOWEST, LONDON"

Temporary Address Change: **UPLANDS, EPSOM ROAD, GUILDFORD.** ***Phone:*** **Guildford 3267-8.**

T.G.S.

Sixteen gas fired boilers representing a combined maximum hourly consumption of 3,770 cu. ft., and necessitating a 4-in. supply, are included in an interesting installation just completed at Englefield Green for heating a large private residence, maintaining exact temperatures in extensive aviaries and orchid houses and providing hot water for the household.



GAS HEATING FOR EXOTIC BIRDS AND FLOWERS

CAPTAIN the Hon. H. R. Broughton, who lives at Bakeham House, Englefield Green, possesses one of the most exquisite collections of tropical birds and orchids and other exotic plants to be found anywhere in this country, and it was for their welfare as well as for home comfort that he adopted a form of heating that has given him entire satisfaction.

The great value of the birds necessitated very careful calculations to ensure that the rather exacting high temperatures would be maintained throughout the year and to provide conditions consistent with the tropical climates of their native haunts. To a great extent the same conditions are necessary for the orchids, which, however, require a variety of temperatures, mostly high, with a considerable degree of humidity.

A 4-in. gas main was taken to the estate, branches being carried to three main boiler houses and nine small enclosures, the latter being provided to accommodate the units which heat the 41 aviary enclosures. The entire bird sanctuaries comprise, in addition to the terrace of 41 aviaries, a small group of self-contained "sitting" houses and a fully equipped bird hospital and food store, where a staff of experts attend to the health of the birds and deal with their dietary problems. The main range of aviaries is divided into three sections, and thence sub-divided into three smaller sections. These nine sections are again divided into 41 cubicles which are maintained at a temperature of 70° F. during the winter months and have wired flights for summer use.

Nine Independent Heating Units

To provide the various degrees of heat to suit the individual requirements of the occupants of the enclosures and to control them automatically, the heating is divided into nine independent units, each of which is served by a No. 20 "B" pattern "Victor" gas fired water heater, regulated by an air operated and also standard immersion type thermostats. The air-controlled thermostats are situated in the middle cubicle of each of the nine sections and enclosed in wire for protection against the birds, some of which, especially those of the Woodpecker family, can be very destructive.

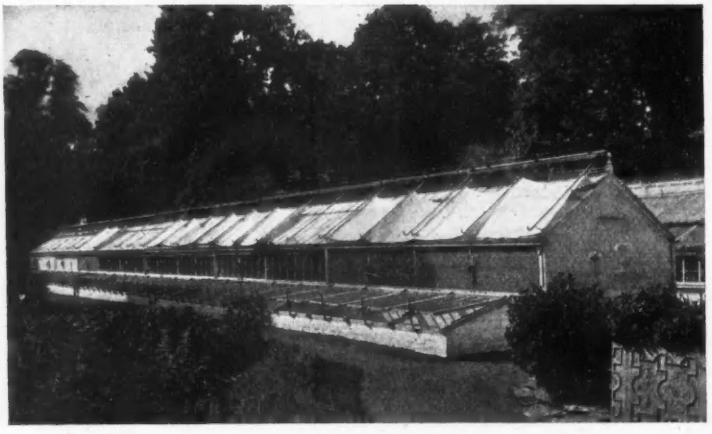
To maintain the desired temperature in these aviary cubicles throughout the winter, 1,265 sq. ft. of radiation had to be provided. This is in the form of Crane wall type radiators built into the partitions and enclosed in wire netting, humidifying trays being provided to ensure moist atmosphere conditions compatible with tropical climates.

Reducing Radiation Losses

The enclosures and aviaries, built by Messrs. Barnards, Ltd., of Norwich, are constructed throughout of double Canadian cedar wood, specially chosen because of its suitability for housing tropical birds all the year round. There is a one inch air space in the "walls," the ceilings being lined to reduce radiation losses at this position. This range of aviaries totals 280 ft. in length, the flights of which are attractively laid out with shrubs, and a stream of running water passes through the entire length, cascading over rockeries, which give a natural and fascinating effect. A by-pass arrangement has been made so that the stream can be diverted from any aviary where infection is suspected. To provide the running water a well was sunk and a ¾ h.p. pump, made by Messrs. F. A. Pullen, capable of delivering 15 gall. per minute against a total head of 40 ft., was installed by Messrs. Thomas Potterton (Heating Engineers), Ltd., who were responsible for the design and installation of the whole of the heating equipment. To meet the problem of the long English winter nights, the aviaries are provided with ultra-violet lighting, so manipulated as to reduce the period of darkness to the tropical average and available for use on dark, foggy days.

The Orchid Houses

Exact temperature control is one of the most important factors in the successful cultivation of orchids. In their native surroundings they flourish sturdily in subdued light, humidity, and heat, and without these constant conditions they perish. There are thousands of different varieties, needing appropriate temperatures at successive stages of cultivation, some being satisfied with 60-65° and others requiring as high as 75-80°. At Bakeham House the whole of the orchid and tropical plant houses are heated by Potterton boilers, and each section of each house is fitted with an air temperature thermostat for maintaining the required temperatures in an appropriate sequence, so that when it is necessary to remove plants from one section to another it can be done without drastic variations of temperature.



Orchid Houses

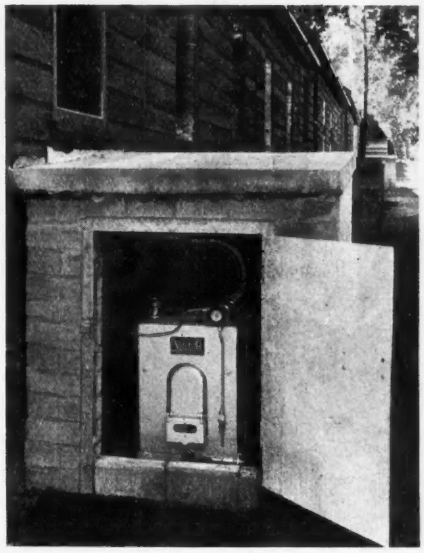
The sixteen heaters installed at Bakeham House have a combined maximum consumption of 3,770 cu.ft. per hour. Each heater, however, is controlled both by an air temperature thermostat and the usual aquastat fitted on the heating unit as standard.

The Gas Boilers

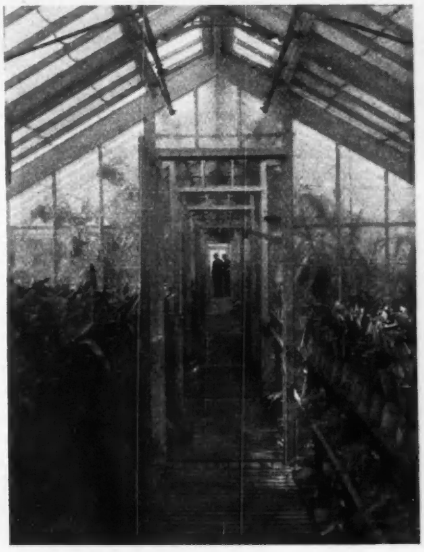
No. 1 boiler house accommodates two Potterton "Rex" gas fired heaters, the duty of which is to warm the long span roof orchid house and the frames adjoining. This heater has a capacity of 288,000

B.Th.U. per hour. The second one is used in connexion with the lean-to orchid house and has a capacity of 198,000 B.Th.U. per hour.

No. 2 boiler house is adjacent to the room in which the food for the birds is stored and prepared, and accommodates two heater having a rating of 198,000 B.Th.U. per hour, and its duty is to warm the orchid and camellia house which adjoins the mansion. The second heater, which is also a 6-section No. 1 Series "Rex," is provided for the private residence installation. The third boiler in this chamber is a "D" Series 3-section "Rex"



Boiler serving Bird House. Others can be seen along the line of the building behind

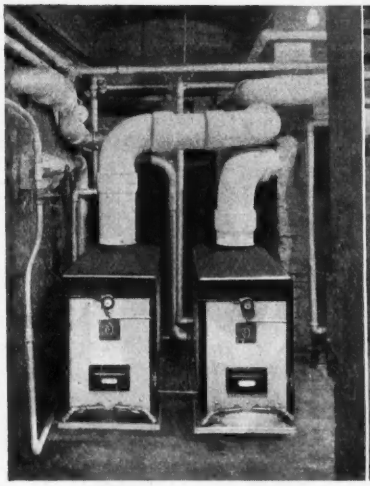


Interior of Orchid House

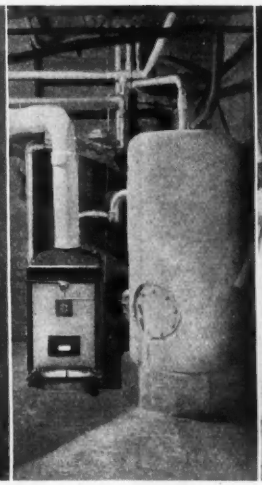
Potterton "Rex" gas-fired water heaters, one of which warms the large independent tropical bird house, while the other deals with the palm house and the birds' hospital. The former boiler has a capacity of 132,000 B.Th.U., and the latter 99,000 B.Th.U. per hour.

No. 3 boiler house, which is situated under the private residence, contains three heaters. No. 1 is a 6-section No. 1 Series "Rex" which is coupled to a 100 gall. storage cylinder which serves the household requirements.

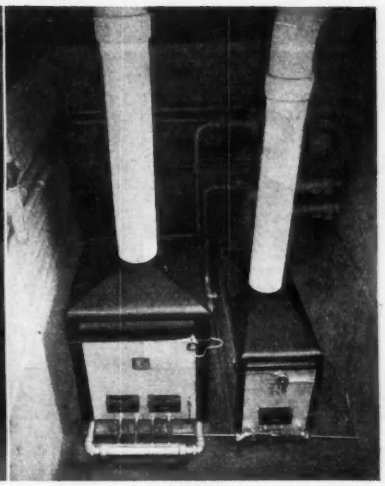
Captain Broughton has expressed his entire satisfaction with the working of the plant, and we understand that the cost of running in the portion where comparison can be made, and where check meters are fitted, is little, if any, more than that of the anthracite previously used.



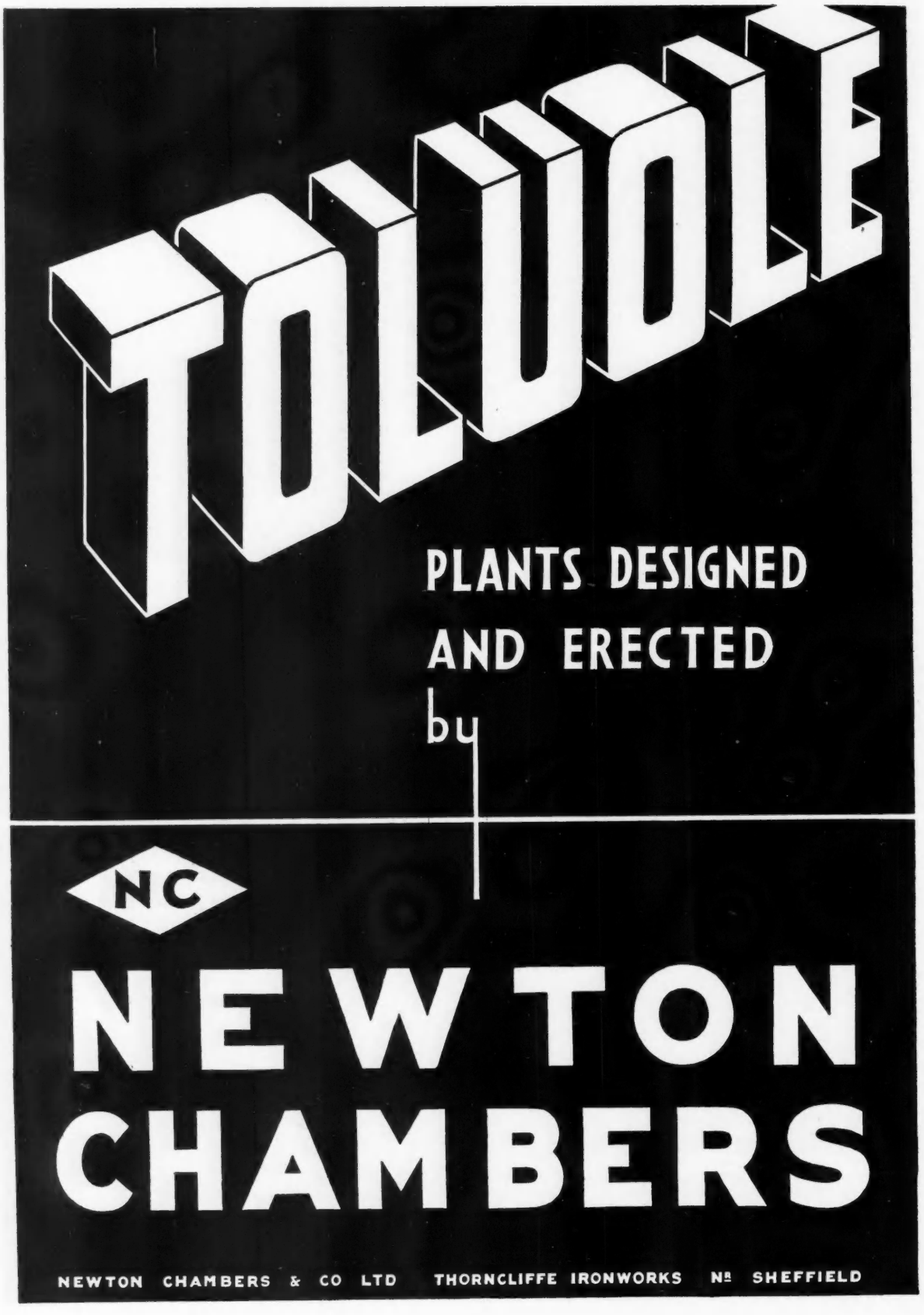
Boilers for Central Heating the Mansion and the Orchid and Camellia Houses adjoining



Boiler and Thermal Storage Cylinder for Domestic Hot Water



Boilers for Orchid House, Greenhouses, and also the Bird Hospital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EXTRACT FROM THE ANNUAL REPORT OF THE
Northern Coke Research Committee

The following is a brief outline of the more important results obtained by the Northern Coke Research Committee during the past year. Fuller information concerning these researches, it is stated, has either been published or will shortly be published in Scientific or Technical Journals.

IT was pointed out in the last Annual Report that generous grants from the Department of Scientific and Industrial Research and from the Research Committee of King's College had made possible the purchase of X-ray equipment, which extended greatly the possible range of the Committee's investigations. The power of this new method of studying the solid state is admirably illustrated by the interesting results which have been obtained in a relatively short time. The early part of the year was occupied chiefly in making the auxiliary apparatus and in developing the technique necessary for these new investigations. Little detailed work upon the structure of coal and coke has been done elsewhere, and the Committee is therefore faced with several years' intensive work supplying much needed information concerning the carbonization process and the fundamental structures of coals and cokes. Until this knowledge is available, much of the research in this field must be of an empirical character.

The Carbonization of Cellulose

As a preliminary to the study of the carbonization of various coals, an investigation of the carbonization of pure cellulose was made, employing X-ray and chemical methods. Samples of char were prepared by heating the cellulose (in the form of "ashless" filter paper) at a definite rate in an atmosphere of nitrogen up to a pre-determined temperature. The chemical composition and the percentage yield of the product were determined and a Debye-Scherrer powder photograph of the char was also made.

Chemical and X-ray investigations have indicated that the so-called "amorphous" black carbons consist of aggregations of minute crystallites possessing a structure similar to that of the graphite crystal lattice. The volatile matter present in cokes and chars is supposed to be present in the form of highly unsaturated rings and chains bonded to the border carbon atoms of the layer planes of the minute graphite crystallites. The lines which appear in the Debye-Scherrer photographs are the 002 and the 100, and the position of these lines on the photographic film permits the calculation of the spacing between the layer planes (002) and of the spacing between the carbon atoms in the layer planes (100). These lines are usually highly diffuse, and from their breadths compared with the breadths of the same lines obtained with macro-crystalline graphite, it is possible to calculate the dimension of the crystallite in the direction responsible for the diffraction line. Unfortunately with these minutely crystalline carbons, only two lines appear which are of sufficient intensity to permit of their use for this purpose, and we have therefore to assume that the minute crystallites are cylindrical. The average height of the cylinders (*c* dimension) is determined from the broadening of the 002 line and the average diameter of the cylinders (*a* dimension) from the broadening of the 100 line.

The results obtained in the carbonization of cellulose under various conditions are shown graphically in Figs. 1 and 2. The results given in Fig. 1 provide the quantitative detail of the qualitative picture of the carbonization process obtained from purely chemical studies. The chemical studies of Smith and Howard (Journ. Amer. Chem. Soc., 1937, 59, 234) indicate that the aromatic condensation of cellulose starts at a relatively low temperature. These X-ray results show that aromatization has progressed so far by 400° C. that the carbon crystallite has a diameter of 9A. This lateral growth continues relatively rapidly up to 700° C., after which the rate of growth falls off, the average *a* dimension reaching 21A at 1,300° C. It is interesting and important that this rate of growth changes in the neighbourhood of 700° C., and it has been shown that this result is not inconsistent with the view that in the neighbourhood of this temperature the elimination of the disordered organic matter has proceeded so far that the amount of hydrogen, and disordered un-

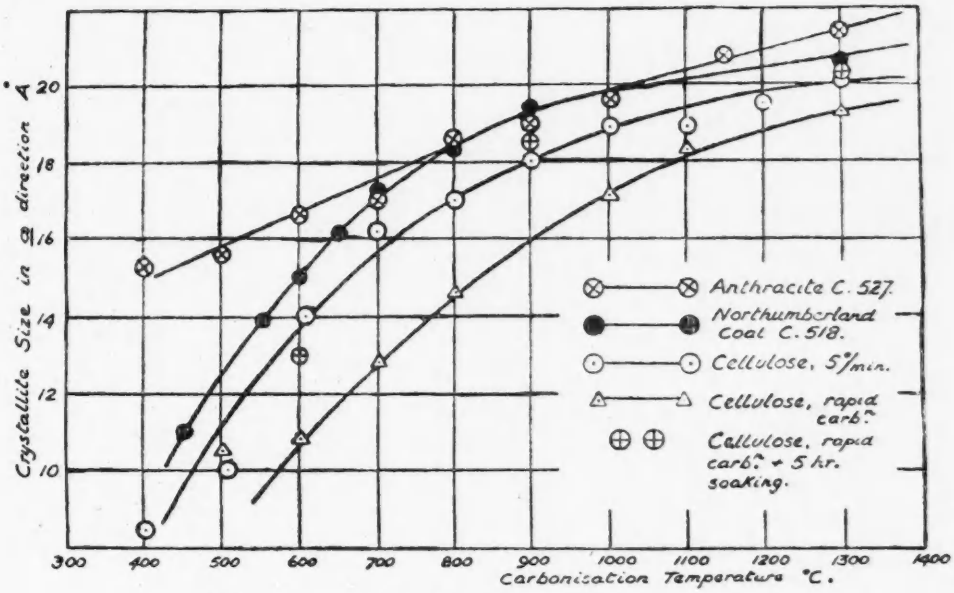

Fig. 1.—Influence of Carbonization Temperature on *a* Dimensions.

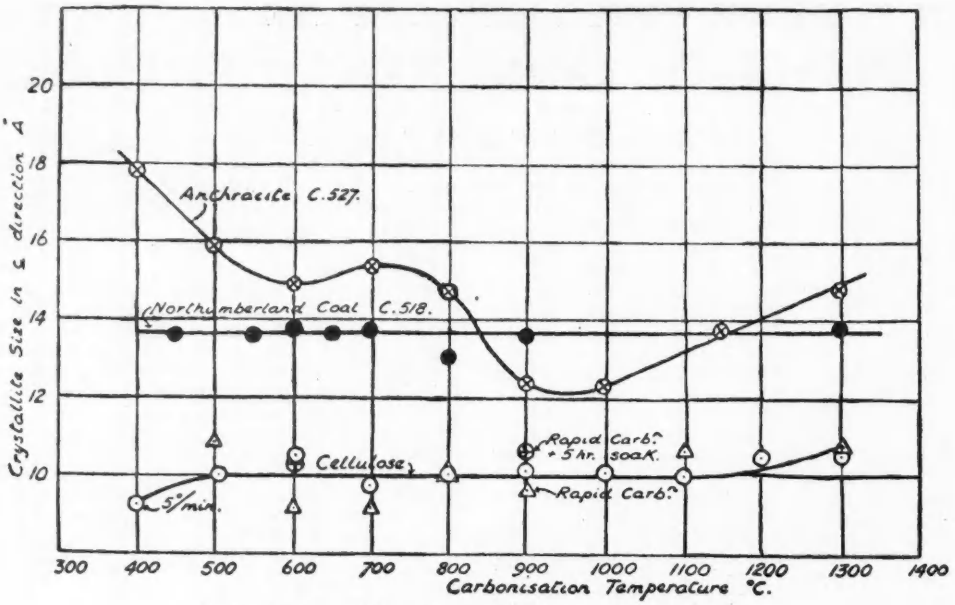

Fig. 2.—Influence of Carbonization Temperature on c Dimensions.

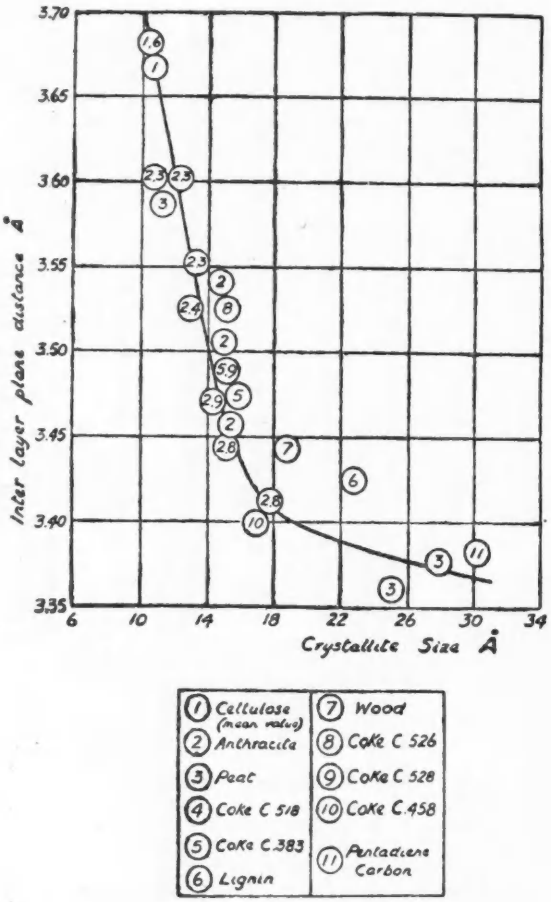

Fig. 3.—Variation of Interplanar Distances with Crystalline Size in c Direction.

saturated carbon rings and chains present are no longer sufficient fully to saturate the border carbon atoms of the hexagon layer planes. During carbonization, border carbons atoms free from extraneous atoms or groups first make their appearance at approximately 700° C., resulting in the liberation of metallic electrons (see Annual Report 1937) and the abrupt change in many other properties. It is now possible to suggest from these X-ray results that the new electronic forces which come into play at 700° C. have their origin in the freeing of the border carbon atoms from absorbed material. This desorption will be accompanied by a tendency of neighbouring crystallites to adsorb each other, thus providing an explanation of the contraction and the secondary increase of strength which occur during carbonization, at temperatures over 700° C.

The results obtained with carbons prepared by rapid heating and those obtained with carbons subjected to prolonged soaking at the maximum carbonization temperature are also shown in Fig. 1, and indicate that the process of aromatization is a relatively slow one and that the values of the *a* dimension obtained in the 5°/min. carbonization are limiting values.

The variation of the *c* dimension with carbonization temperature is shown in Fig. 2, which indicates in the case of cellulose that the carbonization temperature can be varied between 400° and 1,300° C., and the rate of carbonization between 5°/min. and 25°/min. without causing any appreciable alteration of the *c* dimension. These results, and others, indicate that the *c* dimension and therefore the average number of layer planes in the individual crystallites, are determined by some intrinsic property of the raw material itself.

The distance between the layer planes in these small crystallites is an inverse function of the number of layer planes in the crystallite (cf. J. T. Randall, "The Diffraction of X-rays and Electrons by Amorphous olids, Liquids, and Gases." Chapman and Hall, Ltd., 1934)—*e.g.*, in crystallites containing four layer planes the spacing is 3.69, with five layer plants, 3.53, &c. (See Fig. 3.) The variation in this spacing indicates considerable changes in the bonding forces between the planes, and hence it is not unlikely that it plays a considerable part in determining the properties of coke.

Considerable progress has been made in a systematic X-ray study of carbonaceous materials (lignin and peat to anthracite) and their carbonization residues. Although sufficient data have not yet been accumulated to permit of any generalizations, the results already obtained give promise of a much deeper insight into the nature of these substances and of the carbonization process. The following results are of sufficient

interest to record briefly, but it is hoped to be able to give a much more comprehensive picture in the near future.

Northumberland Coal (*weakly coking*).—The development of the *a* dimension of the coke crystallites from 400-1,300° C. is shown in Fig. 1. All the values are slightly greater than the corresponding values of the cellulose cokes. The *c* dimensions indicate an average of five layer planes in the crystallites (Fig. 2).

Welsh Anthracite (*See Fig.* 1).—The dimension in the anthracite itself has already reached a relatively large value, thus confirming the views of Bone and others on the development of " benzenoid characteristics " during coalification. The initial rate of lateral development of the crystallites with carbonization temperature is considerably less than that shown by the Northumberland coal, but it is interesting that the two curves coincide at 700° C. The dimension determinations (see Fig. 2) indicate six layer planes in the original anthracite crystallites, but a progressive decrease occurs at temperatures over 400° C. up to 900° C. and subsequently a tendency to increase. The slow rate of growth of the *a* dimension rules out any explanation of this phenomenon by the growth of one plane at the expense of its neighbours. A possible explanation, which is strongly supported by the fact that the anthracite decrepitates strongly on heating, is that during carbonization, cleavage of the crystallites occurs parallel to the layer planes and is possibly caused by the evolution of gas absorbed on the interplanar surfaces.

X-ray crystallographic studies of the carbonization of (a) cellulose ; (b) lignin ; (c) and (d) two Northumberland coals ; (e) a Durham coking coal ; (f) a South Wales anthracite ; (g) a South Wales low volatile coking coal ; (h) a South Wales steam coal ; (i) sawdust ; (j) peat ; and (k) brown coal, have been made. Although our researches must cover a much wider range of materials before the fundamental laws governing carbonization can be stated with any certainty, the above list of materials is sufficiently extensive and diverse in character to permit of the following tentative suggestions concerning crystallite growth during carbonization.

1. The size of the graphite crystallites formed in the early stages of carbonization apparently depends upon the molecular complexity (in the case of coal upon the rank) of the original carbonaceous material.

2. The slope of the *a* dimension/carbonization temperature curve—*i.e.*, the rate of lateral development of the layer planes of the crystallites—varies from substance to substance in such a way that the smaller crystallites grow more rapidly than the larger. In all the examples studied the average diameter of the crystallites in the 700° cokes is approximately 17A.

3. Above 700° C. the *a* dimension/carbonization temperature curves, with the exception of the peat curve, are very nearly coincident and the crystallites all attain a diameter of within 1A of 20A at 1,000° C.

4. With the exception of anthracite, which has been discussed in detail above (it is not unlikely that a simple pretreatment of the anthracite—*e.g.*, fine grinding and slow carbonization—would make its behaviour in this respect normal) and peat and brown coal, the *c* dimension—*i.e.*, the heights of the crystallites—all remain substantially constant over the carbonization temperature 400-1,000° C. The number of layer planes in the individual crystallites of cokes prepared from coals, appears to increase with the rank of the coal. With the Durham coking coal and the South Wales low volatile coking and steam coals, a pronounced growth in the *c* direction sets in between 1,000° and 1,300° C. This phenomenon is being investigated further. The peat on carbonization gives crystallites which show a very rapid growth in both the *a* and *c* directions as the carbonization temperature increases from 700° to 1,300° C. Brown coal behaves in a similar way, but to a considerably smaller extent. The reason for this anomalous behaviour is not obvious, but it is perhaps connected with the presence of ash, and further work is in progress in an attempt to elucidate this interesting phenomenon.

The above results leave little doubt as to the fruitfulness of the Debye-Scherrer method of investigating the carbonization process. The picture these investigations have provided after only one year's work is surprising in many of its details. Our knowledge of the topochemistry of the carbonization process is, however, still very meagre.

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Should the Gas Industry Sell Water Softeners?

Recent visits to the works of manufacturers of water heaters and water softeners have prompted the following reflections by a member of the "GAS JOURNAL" staff

HOT water is a necessity in every home, and life would be a good deal pleasanter if every home also had soft water. The two requirements are not necessarily related, but where it is possible to combine them there can be no question about the advantages. Only a very few districts are in the fortunate position of having plentiful supplies of naturally soft water. Everywhere else nature has so distributed her salts that the water supply is either "medium hard" (from six to 13°), "hard" (over 13°) or "very hard." Too often the question of hardness is approached by the Gas Industry merely from the point of view of its effect on scaling and little or no regard is paid to the broader aspects of the benefits of soft water to the consumer.

These reflections are prompted by the fact that the Permutit Co., Ltd., has lately produced a softener designed primarily for use with water heaters. One of the main claims for this new "D.H." softener is that it will keep the water heater free from scale and therefore will not allow any falling off in efficiency from this cause. The softener, finished in white with chromium plated fittings and capable of being fixed on any wall, consists of a cylinder in which the water passes through the usual softening material and the only care which it requires is regenerating with common salt at intervals. The "D.H." softener is provided with a single control valve to carry out the regeneration and the whole process can thus be effected merely by turning one handle in a certain sequence. The softener is pressure-proof and is constructed to withstand a pressure of 125 lb. per sq.in. No weighing of salt is necessary, as a specially marked jar is provided so that it can be easily measured. The softener is made in two sizes, Model 1 being capable of softening 75 gal. of London water (16° hard) between regenerations, and Model 2 twice that volume.

Four Different Angles

The matter of hot and soft water is worth studying from four different angles, those of the consumer, the water heater manufacturer, the water softener maker, and the Gas Industry. The water supply authorities might be included in the study but for the fact that their only concern is the consumption of water as it is delivered through the mains, and whether it is hot and/or soft when it is used is immaterial to them.

The consumer thinks of soft water not merely as a means of keeping his apparatus in an efficient condition but as a much more valuable household commodity than hard water. It is nature's aid to beauty; it stops waste, improves food and tea and coffee, saves soap and cleaning materials, and reduces fuel bills by preventing kettles and hot water pipes and heaters from "furring."

Hardness in relation to water heating has been studied ever since scale was first discovered, and the water heater makers have long since realized that apart from the industrial disadvantages of hard water, the hardening salts are responsible for the deposition of scale when water is heated in kettles, calorifiers, boilers, economizers, washing machines, water cooling pipes and jackets, radiators, and water heaters. There is ample evidence that they have given full attention to these problems, and a perusal of Dr. Bernard Friedman's brochure, "Hardness of Water: Its Bearing on Water Heating" (Ascot Gas Water Heaters, Ltd.), suffices to show how they have met the problem so far as the maintenance of efficiency of water heating appliances is concerned. Descaling has become a simple process, and the clearest possible directions are given as to how, when, and under what circumstances the process should be carried out in order to ensure not only immediate efficiency but long and serviceable life. Thus it may be said that the water heater user who does not possess a softener is assured, by more frequent descaling, of the same efficiency as that enjoyed by the possessor of a softener, but he is still without all the other advantages offered by soft water.

Essential Requirements

A passage from Dr. Bernard Friedman's book touching on the use of water softeners in conjunction with "Ascot" gas water heaters is worth quoting. He says:

"It is quite possible to use "Ascot" gas water heaters in conjunction with water softeners, providing that the softener is of sufficient capacity and complies with the following requirements: (1) The water softener must be pressure proof; (2) it must be rated to pass at least two gallons of water per minute in the case of multipoint heaters and one gallon in the case of sink heaters without the softening material being carried over into the system; (3) the water pressure losses must be such that, with a flow as in (2) above, a working pressure of 15 ft. head of water measured vertically from the highest draw-off hot water tap to the level of water in the cold supply tank, is available. With mains type, the working pressure should be not less than 8 lb. per sq. in. with the required flow; (4) the water pressure losses throughout the period of operation should remain constant; (5) (*a*) should have means of flushing back, (*b*) salt solution must not pass through the appliance when softener is regenerated; (6) softener should incorporate a filter, easily accessible, to prevent dirt, hairs and reagent from passing to the appliance, or choking the filter. An assurance that the proposed water softener is in accordance with the six points mentioned above should be obtained from the manufacturers of the water softener before making the installation. Alternatively, a mains type softener may be used to supply softened water to the tank."

Softeners, like heaters, have always sold themselves on their own merits, but there is a great deal of publicity value in the "soft water aid to beauty" type of sales appeal that is lost unless the two interests work together. In ideal circumstances every household would soften every drop of water coming through the mains supply, just as it would ensure that hot water was available at every "hot" tap, but until those happy conditions arrive most people must be content with something short of perfection, and it is here that the softener makers score by offering an appliance specially designed for use in conjunction with the heater.

The Salesman's Viewpoint

Looking at the question from the gas salesman's point of view it is impossible to believe that there is anyone who would argue that because water is hard and deposits scale, gas consumption is increased. It is quite possible that with perfectly soft water it would take less gas to produce a given quantity of hot water, but already we are converted to the idea that the more attractive we make the appeal of comfort in the home the more gas we shall sell, and if the joy of a wash is enhanced by water softening it is surely not difficult to conceive the idea of selling "more washes per week."

The salesman whose sole interest is to sell water heaters, especially to people of limited means, will perhaps be reluctant to tell the consumer that he should have a softener too, whereas the man who is selling only softeners has no such problem, for he is selling soft water luxury to people who must in any case find some means of heating their water.

The appliance referred to earlier in these notes has already met with a good reception in many quarters, and the makers are satisfied that it meets a definite need, but what they have not yet ascertained is the general attitude of the Gas Industry towards the principle of selling water softening as well as heating. They would welcome indications of actual

experience or expressions of opinion, bearing in mind that what is envisaged is not so much the sale of a certain number of machines but the selling of the whole idea of soft water. It may be argued that certain gas undertakings would not be justified in selling appliances not directly concerned with the consumption of gas, but so far as the point has been legally investigated it seems that the softener has a sufficient bearing on gas to justify its inclusion in the showroom.

In any case the makers could, if they so desired, develop their independent sales scheme, either direct or through kindred trades, but they would certainly like to know what the Gas Industry thinks about it.

Technical Aspects

One of the new Permutit "D.H." softeners has actually been on test in conjunction with an "Ascot" boiling water appliance, and by the kindness of Mr. Leopold Friedman, Assistant Managing Director of the Ascot Company, we are able to reproduce the salient points from a report made by that Company's own technical research department.

The softener has a capacity of 150 gal. London water, and the rated output is 60 gal./hr. with a possible overload margin of 120 gal./hr. for short periods of use. Permanent and temporary hardness is softened down to zero, and the appliance is pressure proof up to 180 lb./sq.in. According to the working instructions the time required for regeneration is 70 minutes, and 2 lb. of salt is needed for each regeneration. The report mentions that a soap test set is supplied with each appliance and that representatives of the makers visit users periodically to check the functioning of the softeners; also that in future appliances it will be possible to have a needle valve fitted to supply water at a hardness of 5°.

Recording the results of tests, the report states that the pressure losses were satisfactory. The hardness test results were satisfactory and practically within the makers' specifications. Carried out according to instructions, regeneration took 70 minutes, the operations being simple and straightforward and well within the ability of the average consumer. The limit of hardness allowed by the testing set indicator for regenerating is 1.8° total hardness. The softener was pressure proof at 180 lb./sq.in.

The report concludes wth the following summary: Assuming that the average use of an RS 52/1 "Ascot" heater is half hour per day on position hot (15 gallons) and five gallons of water are drawn off from the cold tap, this gives a weekly consumption of 140 gallons. If the softener was used according to the Permutit soap tests, regeneration would be necessary once a week. The total cost per year of salt at 1d. per lb. would therefore be 8s. 8d. plus the cost of the soap solution, approximately 2s. per year. The softener conforms in regard to performance to the data as given by the manufacturers.

This display by the Eastbourne Gas Company in a recent local carnival shows an effective contrast between primitive bathing arrangements and the efficient modern service provided by the up-to-date white porcelain enamelled Ewart multi-point gas heater.

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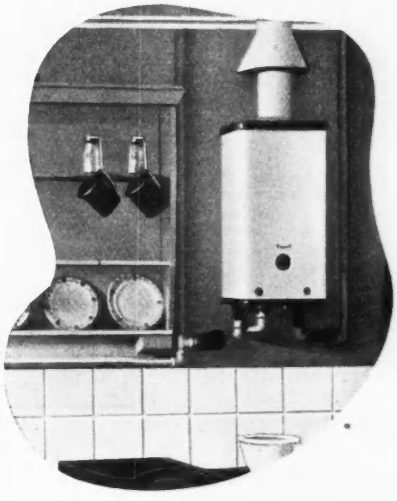

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Gas Undertakings' Results

Accrington

According to the annual report of the Accrington and District Gas Board (controlled by neighbouring District Councils and the Accrington Borough Council) for the last financial year, the net deficit was £3,020, against a deficit of £873 for the previous year. On revenue account total expenditure was £57,027 and income £86,472, leaving a gross profit of £29,445. Prepayment consumers show a reduction of £954; industrial consumers, £721 ; and other consumers (including public lighting), £1,957. Acute trade depression, loss of public lighting, and increased rates, &c., were responsible for the revenue deficit. The quantity of gas accounted for totalled 569,808,000 cu.ft., a decrease of 28,023,000 cu.ft. Gas sold for different purposes was: Prepayment consumers, 48.17%; industrial consumers, 27.84%; public lighting, 2.60%; other consumers, 20.65%; used by Board, 0.74%. New consumers numbered 288; and cooking, heating, and lighting appliances fixed, 3,318. Gas sold for public lighting was 14,814,100 cu.ft., a decrease of 6,529,900 cu.ft.

Edinburgh

The accounts of the City of Edinburgh Gas Department for the twelve months ended May 28 last show that the total quantity of gas sold was 4,031,951,347 cu.ft., which compares with 3,948,047,831 cu.ft. in the preceding twelve months. Ordinary domestic consumers took 1,866,041,190 cu.ft.; ordinary consumers other than domestic, 941,036,076 cu.ft.; prepayment consumers, 914,296,962 cu.ft.; stair lights, 72,467,847 cu.ft.; public lamps, 208,446,533 cu.ft.; and in bulk, 29,662,739 cu.ft. When compared with the previous year, the consumption in public lamps is about 20,000,000 cu.ft. up, which is particularly gratifying in that it follows increases over the previous half-dozen years. The only items which reveal a falling-off on the present occasion—and that of no more than 7,000,000 cu.ft. in the one case, and of 3,000,000 cu.ft. in the other—are ordinary consumers other than domestic and stair lights respectively. The total number of consumers is up from 135,586 to 137,988 ; while the average price of gas per 1,000 cu.ft. (2s. 5.14d. net) has been a trifle less than in the preceding year. The number of public lamps has risen from 25,907 to 27,972. Close upon 28,000 appliances are out on the instalment system. There is a surplus on Revenue Account for the year of £136,519, and after meeting interest and capital charges and income-tax, a balance of £11,706 remains at credit of Net Revenue Account.

Newark

The output of the Newark Gas Department has increased by 2.1% to 192 million cu.ft. Income amounted to £50,352 and expenditure to £35,728, leaving a gross profit of £14,624 against £14,604 last year. Of this amount, interest required £3,310, sinking fund £6,717, reserve for working capital £202, and income-tax £1,899, leaving a net profit of £2,496 against £2,020 the previous year. The Department has not increased the price of gas.

Stretford

The total quantity of gas sold by the Stretford and District Gas Board during the twelve months ended March 31 last was 1,356,676,800 cu.ft., which compares with 1,288,623,200 cu.ft. for the preceding year. During the past twelve months, 51.89% of the gas sold has been for industrial purposes at special rates. At March 31 the total number of consumers was 33,579—13,573 ordinary, and 20,006 prepayment. This is an increase over the previous year of 1,250 in the total number—55 ordinary and 1,195 prepayment. The average price of coal per ton prior to the introduction of the Coal Selling Scheme was 15s. 6d. For the year to March last the price had increased to 21s. per ton—a rise of 5s. 6d. per ton, or 35%. The Board appeared before the Midland (Amalgamated) District Committee of Investigation last November, and lodged a complaint against the high prices they were called upon to pay. The finding of this Committee upheld the Coal Selling Scheme. The two-part tariff system of charge which was offered to domestic consumers as from October 1, 1934, is being taken up by an increasing number of consumers. At March last agreements had been completed by 8,286 consumers, of whom 3,162 were consumers by ordinary meter, and 5,124 by prepayment meter. A gross balance on Revenue Account of £59,023 compares with £68,330 for the previous year. There is a credit balance on Net Revenue Account for the year of £2,013. The heavy increase in the price of coal and materials has been accompanied by a general weakening of the residuals markets. Oil has been, and is being, offered at very low rates to industrial users in Trafford Park, and difficulty is being experienced in retaining gas load when competing with very low priced fuel oil.

Trade News

Fixing Practice and the Civil Defence Act

Much has been written on the subject of what to do in the matter of conforming to the requirements of the Civil Defence Act, 1939; but very little explanation has been given of how to do it. In a folder just issued by the Rawlplug Co., Ltd., of Cromwell Road, S.W.7, many valuable hints are given on the fixing of shutters, screening of apparatus, &c. The Rawlplug company have for many years specialized in fixing problems, and these examples of their various uses have been prepared as a guide in complying with the Act.

The leaflet describes and illustrates in a practical manner how Rawlplugs can assist in securing fittings in air raid shelters and in fixing detachable shutters over windows. The advantages of detachable shutters are, of course, obvious. They need only be placed in position during an emergency period, and full use can be made of daylight during normal conditions. With any form of permanent shuttering this is impossible, and lighting costs are consequently increased considerably. A list and full details are given of the various Rawlplug fixing devices recommended for specific A.R.P. purposes, and the leaflet will be extremely useful to those engaged on these problems.

Automatic Temperature Regulators

In view of the marked tendency in these days towards the automatic control of processes wherever possible, a new 32-page book on Cambridge automatic temperature regulators published by the Cambridge Instrument Co., Ltd., 13, Grosvenor Gardens, S.W.1, is of particular interest. The book illustrates and describes regulators of many varied types designed to cover the requirements of practically all industrial processes to which automatic temperature control can be applied. An introductory note points out that a "saw tooth" record may be a more reliable indication of accurate and effective control than a straight line. In any case, it cannot justly be claimed that any regulator will give straight line control without reference to the conditions under which the instrument is to work. Indeed, it is correct to say that if the regulator is sufficiently sensitive and the heat receiving units are properly placed, then "hunting" or temperature variations within limits are bound to occur and be shown on the chart. It is partly to show these variations and keep them within permissible bounds that recording regulators are installed. Items of special interest mentioned in the book are a compact gas regulator for gas-heated processes, incorporating an internal valve and by-pass, a self-contained regulator for gas-heated linotype pots, eliminating faulty slugs and time wastage, and a simple and robust recording regulator for gas, oil, steam, or electric heating plants at temperatures up to 600° C.

New Parkinson Wall Type Heater

The wall type "Zonette" reflector gas heater is the latest introduction of the Parkinson Stove Co., Ltd., and one of the strongest points in its favour in these days of fuel rationing is that the gas consumption is surprisingly small. As the illustration shows it is attractive in appearance, and it is strongly constructed, and designed so that it may be fixed to the wall with ease. The heater is 18½ in. wide, 16⅞ in. high and 4⅜ in. deep, and it is intended to be fixed to the wall by means of four screws in such a position that the heating element is 3 ft. from the floor level. A cosy beam of warmth is reflected forward by the fire, and its modern lines harmonize ideally with present-day interior decoration.

Parkinson's "Zonette" Heater

Gas Chambers and Coke Ovens, Ltd.

Gas Chambers & Coke Ovens, Ltd., would like all gas engineers to know that their technical resources are at their entire and immediate disposal, whether in the construction of new carbonizing plant, the resetting of old carbonizing plant (intermittent verticals, continuous verticals, or horizontals), and the building or renewing of handling plant, benzole plant, and sulphate plant. The firm's organization and technical staff are available and ready to give all possible assistance in their power.

Markets and Manufactures

Current Sales of Gas Products

The London Market

Sept. 11.

Under present circumstances it is impossible to quote market prices for tar products. The export of all tar products is now prohibited except under licence, and, pending Government action, all prices in the home market are purely nominal.

The Provinces

Sept. 11.

Crude Gas-Works Tar, 10s. to 15s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 25s. to 27s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 25s. to 27s.* Toluole, naked, North, 1s. 10d. to 1s. 11d. Coal tar, crude naphtha, in bulk, North 7¼d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 2¼d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 3⅞d. to 4⅛d.; low gravity, 4d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal, "B" quality unsaleable. Heavy oil: Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5½d. to 5¾d.; heavy tar oil, gr. less than 1,080, 4¼d. to 4¾d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls, whatever they may be.

Scotland

GLASGOW, Sept. 9.

In view of the rather uncertain position of the market producers have increased prices to cover eventualities. At the moment, however, there is not a great deal of business being conducted.

Crude gas-works tar.—Actual value is nominal at round 26s. to 28s. per ton *ex* works in bulk.

Pitch of vertical quality is unchanged with prices round 20s. to 21s. per ton f.o.b. for export and 20s. per ton *ex* works in bulk for home trade.

Refined tar is also unchanged at 3¼d. to 4d. per gallon. Export supplies can be secured at about 2½d. to 2¾d. per gallon, into buyers' packages at makers' works.

Creosote oil.—It is not likely that any material change will take place in prices, but makers are refraining from quoting special grades. Specification oil, 3¼d. to 3⅜d. per gallon; low gravity, 4¼d. to 4½d. per gallon; neutral oil, 3¼d. to 4d. per gallon; all *ex* works in bulk.

Cresylic acid.—Prices have been raised to a more economic level as follows: Pale, 97/99%, 1s. 5d. to 1s. 6d. per gallon; dark, 97/99%, 1s. 2d. to 1s. 4d. per gallon; pale, 99/100%, 1s. 8d. to 1s. 10d. per gallon; all *ex* works in buyers' packages.

Crude naphtha is meantime unchanged at round 5d. to 5½d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 4d. to 1s. 5d. per gallon and 90/190 heavy naphtha is about 1s. 1¼d. to 1s. 2d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—Prices are nominal at 12s. to 13s. per gallon for 90/160 grade and 14s. to 15s. per gallon for 90/140 grade.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole ...	0 9½	to	0 10	per gall. at works
Motor ,, ...	1 3	,,	1 3½	,, ,, ,,
90% ,, ...	1 4	,,	1 4½	,, ,, ,,
Pure ,, ...	1 8	,,	1 8½	,, ,, ,,

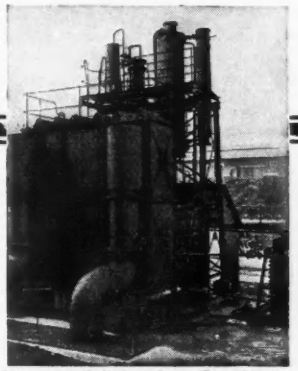
Contract Advertised

Benzole Plant.
Oldham Gas Department. [p. 622.]

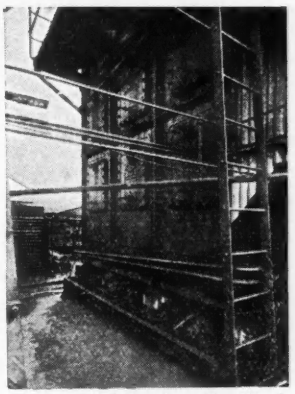
Resheeting Gasholder.
Ennerdale Gas Department. [p. 622.]

Dividends Announced

Vickers, Ltd.—The Directors of Vickers, Ltd., give notice that an interim dividend of 4% (actual), less income tax, at 5s. 6d. in the £, on the ordinary stock of the company in respect of the year 1939 will be paid on Oct. 26, 1939.



"Permac" Joints in a Gas Works.



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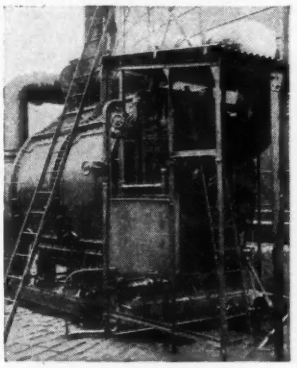

"Permac" Joints in a Gas Works.

Permac
METAL-TO-METAL JOINTING MATERIAL

Ever since 1913 "PERMAC," the original Metal-to-Metal Jointing, has been holding up difficult joints like these in important Gas Works and on Coke Oven Plants all over the world. Equally suitable for any joint—steam, water, gas, oil—screw pipe or flange. Send for particulars.

Manufactured only by

Thomas & Bishop LTD.
37, Tabernacle Street, LONDON, E.C.2
Telephone: Clerkenwell 3351 (2 lines)

MODERN DESIGN—

MODERN

EQUIPMENT

Pressure producer equipment installed with Glover-West vertical retorts for the Leeds Corporation Gas Department (Meadow Lane Works)

West's carbonizing plants combine the features of present-day practice by which the most exacting requirements of retort house control and efficiency are met. The increased fuel economy realised by the introduction of pressure producer equipment is one direction in which the ideal of maximum results from the coal carbonized is attained.

WEST'S

WEST'S GAS IMPROVEMENT CO., LTD. MILES PLATTING, MANCHESTER 10
AND BATH ROAD, HARMONDSWORTH, WEST DRAYTON, MIDDLESEX.

GAS STOCKS AND SHARES

On the Stock Exchange, as elsewhere, most of the past week was necessarily taken up by the change-over from peace to war-time conditions, and the smoothness with which this has been carried out augurs well for the future. The "House" reopened on Thursday, and although the regulation that all dealings were to be for cash naturally curtailed business, there was a fair amount of activity. Gilt-edged stocks were dealt in at about the official minimum prices, and some unofficial minimums have been fixed by dealers for home-rail stocks. In most of the other sections business was being done at levels almost comparable to those ruling prior to the outbreak of war, there being a special demand for rubber, iron, and steel shares.

These are early days yet to make any forecast as to the ultimate affect of the war on gas stocks and shares. The large evacuation movement, both official and unofficial, which has taken place from the more vulnerable areas of the country to the less congested districts will undoubtedly prove very profitable to many provincial undertakings. On the other hand, the movement will make heavy inroads into the revenues of those companies operating in the areas evacuated and unless this is offset by a considerable increase in the industrial load, some rearrangement of its financial resources by the Industry as a whole may be inevitable if the war is of long duration.

Business in the Gas Market last week was practically confined to a few transactions in Gas Light units and Imperial Continental stock, and it will be seen in the Lists that apart from a few ex div. movements quotations so far have remained unchanged.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 7.	Rise or Fall on Week.
1,767,439	Sept. 4	8	8	Alliance & Dublin Ord. ...	125—135*	−5
374,000	June 19	4	4	Do. 4 p.c. Deb. ...	88—93	...
877,576	May 8	5	5	Asscd. Gas & Water U'd'ts Ord.	16/—18/−	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
535,545	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	16/—18/−	...
318,730	,,	4	4	Do. 4 p.c.Irred. Cum. Pref.	15/—17/−	...
750,000	Mar. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
560,070	Aug. 21	7	7	Barnet Ord. 7 p.c.	148—158	..
300,000	Apl. 6	1/4⅜	1/9⅜	Bombay, Ltd.	19/—21/−	...
181,185	Aug. 21	9½	9½	Bournemouth Sliding Scale ...	182—192	...
690,526	,,	7	7	Do. 7 p.c. max. ...	146—151	...
493,960	,,	6	6	Do. 6 p.c. Pref. ...	122—127	...
50,000	June 5	3	3	Do. 3 p.c. Deb. ...	70—75	...
362,025	,,	4	4	Do. 4 p.c. Deb. ...	95—100	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	110—115	...
357,900	Aug. 21	7½	7½	Brighton, &c., 6 p.c. Con. ...	130—135	...
659,955	,,	6⅝	6⅝	Do. 5 p.c. Con. ...	115—120	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref. ...	108—113	...
855,000	Mar. 20	7	8	British Ord.	100—110	...
100,000	June 19	7	7	Do. 7 p.c. Pref.	136—141	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...
120,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	..
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
100,000	22 May '33	6	4	Cape Town, Ltd.	¼—¾	...
100,000	6 Nov. '33	4½	4½	Do. 4½ p.c. Pref.	⅛—½	...
150,000	June 19	4½	4½	Do. 4½ p.c. Deb.	58—68	...
626,860	July 17	6	6	Cardiff Con. Ord.	108—113	...
237,860	June 5	5	5	Do. 5 p.c. Red. Deb. ...	102—107	...
98,936	Mar. 20	2/−	2/−	Colombo Ord.	1 7/16—1 7/16	...
24,510	,,	1/4⅜	1/4⅜	Do. 7 p.c. Pref.	21/—23/−	...
739,453	Mar. 20	−/11.48	−/11.48	Colonial Gas Assn. Ltd. Ord. ...	16/—18/−	...
296,144	,,	1/3.30	1/3.30	Do. 8 p.c. Pref.	21/—23/−	...
1,775,005	July 31	4	4	Commercial Ord.	47—52*	...
140,000	Aug. 21	4	4	Do. 4 p.c. Red. Pref. ...	90—95	...
620,000	June 5	3	3	Do. 3 p.c. Deb.	56—61	...
286,344	Aug. 21	5	5	Do. 5 p.c. Deb.	103—108	...
200,000	,,	3⅜	3⅜	Do. 3⅜ p.c. Red. Deb. ...	94— 99	...
807,560	July 31	7	7	Croydon sliding scale	121—126	...
644,590	,,	5	5	Do. max. div.	92—97	...
620,385	June 19	5	5	Do. 5 p.c. Deb.	107—112	...
208,660	Aug. 21	5	5	Dudley, Brierley Hill & Dist. Ord.	100—105	...
82,275	,,	5	5	Do. 5 p.c. Con. Pref. ...	100—105	...
79,000	,,	3⅜	3⅜	Do. 3⅜ p.c. Red. Deb. ...	94—99	...
239,000	July 31	5	5	East Hull Ord. 5 p.c.	86—91	...
187,215	Aug. 21	6	5⅜	East Surrey Ord. 5 p.c. ...	98—103	...
176,211	June 5	5	5	Do. 5 p.c. Deb. ...	105—110	...
250,000	July 3	4	8	Gas Consolidation Ord. 'B' ...	18/6—20/6	...
250,000	May 22	4	4	Do. 4 p.c. Red. Cum. Pref.	17/—19/−	...
19,172,463	July 31	5⅜	5⅜	Gas Light & Coke Ord. ...	17/6—20/−a	...
2,600,000	,,	3½	3½	Do. 3½ p.c. max.	65—70	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref. ...	87—92	...
2,993,000	July 3	3⅜	3⅜	Do. 3⅜ p.c. Red. Pref. ...	90—95	...
8,602,497	May 22	3	3	Do. 3 p.c. Con. Deb. ...	64—69	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb. ...	105—110	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	103—108	...
700,000	Sept. 4	3½	3½	Do. 3½ p.c. Red. Ded. ...	88—93*	−2
270,466	July 31	6	6	Harrogate New Cons.	95—100	...
157,500	Mar. 20	‡1/−	‡1/−	Hong Kong and China Ord. ...	⅜—½	...
5,600,000	May 8	8	12	Imperial Continental Cap. ...	100—110	...
172,810	July 31	3½	3½	Do. 3½ p.c. Red. Deb. ...	85—90	...
63,480	June 19	3	3	Maidstone & p.c. Deb.	57—62	...
45,000	May 22	†10	†10	Malta & Mediterranean ...	128—133	...
				Metropolitan (of Melbourne) ...		
392,000	Apl. 6	5½	5½	5½ p.c. Red. Deb.	98—103	...
231,977	Aug. 21	5	5	M.S. Utility 'C' Cons.	93—98	...
968,658	,,	4	4	Do. 4 p.c. Cons. Pref. ...	82—87	...
390,076	June 19	4	4	Do. 4 p.c. Deb. ...	90—95	...
148,955	June 19	5	5	M.S. Utility 5 p.c. Deb. ...	105—110	...
125,000	July 3	3½	3½	Do. 3½ p.c. Red. Bds. ...	92—95	...
675,000	May 8	†6	†3	Montevideo, Ltd.	52—62	...
250,000	Aug. 21	7½	7½	North Middlesex 6 p.c. Con. ...	133—138	...
396,160	July 31	5	5	Northampton 5 p.c. max. ...	101—106	...
300,000	April 24	†9	†7	Oriental, Ltd.	135—145	...
468,537	June 5	7	8	Plymouth & Stonehouse 5 p.c.	112—117	...
621,667	July 31	8½	8½	Portsmouth & Gosport Cons.	132—142	...
241,446	,,	5	5	Do. 5 p.c. max.	95—100	...
73,350	,,	5	5	Do. 5 p.c. Pref.	100—105	...
75,000	,,	4	4	Do. 4 p.c. Pref.	81—86	...
114,000	July 31	5	5	Preston 5 p.c. Pref.	100—105	...
247,966	June 19	4	4	Primitiva 4 p.c. Cons. Deb. ...	95—100	...
625,959	July 17	4	4	Do. 4 p.c. Red. Deb. ...	93—98	...
15,000	Sept. 4	6	6	San Paulo 6 p.c. Cum. Pref. ...	7½—8½	−¼
441,275	May 8	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	19/—21/−	...
460,810	Mar. 20	−/10⅝	−/10⅝	,, ,, 4½ p.c. Cum. Pref. ...	18/6—20/6	...
133,201	Aug. 21	5	8½	Shrewsbury 5 p.c. Ord. ...	107—117	...
9,000	June 5	‡4	‡4	South African Ord.	4—5	...
1,996,297	Aug. 21	1/2⅜	1/2⅜	South East'n Gas Cn. Ld. Ord.	20/—22/−	...
1,000,000	,,	−/10⅜	−/10⅜	Do. 4½ p.c. Red. Cum. Pref.	18/—20/−	...
769,191	,,	4	4	Do. 4 p.c. Cum. Pref. ...	15/—17/−	...
450,000	,,	4	4	Do. 4 p.c. Deb.	95—100	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
6,709,895	July 31	6	5	South Met. Ord.	75—80	...
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	115—120	..
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	80—85	...
1,895,445	June 19	3	3	Do. 3 p.c. Deb.	68—73	...
1,000,000	July 17	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...
600,000	,,	3⅜	3⅜	Do. 3⅜ p.c. Red. Deb. ...	92—97	...
1,543,795	July 31	6	6	South Suburban Ord. 5 p.c. ...	97—102	...
512,925	,,	5	5	Do. 5 p.c. Pref.	101—106	...
500,000	,,	4	4	Do. 4 p.c. Pref.	83—88	...
250,000	,,	3⅜	3⅜	Do. 3⅜ p.c. Red. Pref. ...	89—94	...
888,587	June 5	5	5	Do. 5 p.c. Deb.	105—110	...
250,000	,,	4	4	Do. 4 p.c. Deb.	89—94	...
200,000	July 31	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	...
427,859	Apl. 6	9⅜	1/2⅜	S. Western Gas & Water Ord.	15/—17/−	...
160,523	Apl. 6	−/10⅜	−/10⅜	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
110,000	June 5	4	4	Do. 4 p.c. Red. Deb. ...	92—97	...
750,541	July 31	5½	5	Southampton Ord. 5 p.c. ...	100—105	...
148,836	June 5	4	4	Do. 4 p.c. Deb.	89—94	...
350,000	July 31	5½	5½	Swansea 5½ p.c. Red. Pref. ...	102—107	..
200,000	June 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	89—94	..
1,076,490	July 31	6⅜	6⅜	Tottenham and District Ord....	98—103	...
409,835	,,	5½	5½	Do. 5½ p.c. Pref.	108—113	...
62,235	,,	5	5	Do. 5 p.c. Pref.	100—105	...
453,380	June 19	4	4	Do. 4 p.c. Deb.	87—92	...
85,701	June 5	6	6	Tuscan 6 p.c. Red. Deb. ...	95—100	...
1,247,505	May 8	4	6	U. Kingdom Gas Cor. Ord. ...	15/—17/−	...
1,085,952	May 8	4½	4½	Do. 4½ p.c. 1st Cum. Pref. ...	17/—19/−	...
772,709	,,	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	17/6—19/6	...
745,263	June 5	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pf.	13/6—15/6	...
1,093,656	Mar. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	92—97	...
378,106	Mar. 6	7	7	Uxbridge, &c., 5 p.c.	117—122	...
133,010	,,	5	5	Do. 5 p.c. Pref.	100—105	...
1,371,138	July 31	7	6½	Wandsworth Consolidated ...	107—112	...
2,525,768	,,	4	4	Do. 4 p.c. Pref.	82—87	...
1,343,964	June 19	5	5	Do. 5 p.c. Deb.	103—108	...
383,745	,,	4	4	Do. 4 p.c. Deb.	89—94	...
400,000	,,	3⅜	3⅜	Do. 3⅜ p.c. Red. Deb. ...	92—97	...
558,342	July 31	6⅜	6⅜	Watford and St. Albans Ord. ...	107—112	...
200,000	,,	5	5	Do. 5 p.c. Pref.	100—105	...
200,000	,,	5½	5½	Do. 5½ p.c. Pref.	106—111	...
200,000	,,	4	4	Do. 4 p.c. Rd. Pf. (1973/8)	90—95	...
100,000	—	—	—	Do. 4 p.c. Red. Pf. (1959)	97—102	...
200,000	June 19	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
200,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	83—88	...

a.—The quotation is per £1 of Stock. * Ex. Div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Contd.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations Sept. 8.	Rise or Fall on Week.
202,152	Sept. 4	5	5	Ascot Ord.	95—100*	−2
128,182	July 3	5	5	Do. 5 p.c. Pref.	101—106	...
31,035	Aug. 21	−/4⅛	−/4⅛	Associated Utilities 4 p.c. Pref.	15/—17/−	...
100,000	June 19	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
17,000	Aug. 21	8	8	Bognor Orig. Ord. 'A' ...	137—147	...
62,210	,,	8	8	Do. New Add. 'A' ...	137—147	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	132—142	...
37,440	July 31	10	10	Cam. Univ. & Town 10 p.c. max.	160—170	...
125,970	,,	7	7	Do. 7 p.c. max.	115—125	...
39,025	,,	5	5	Do. 5 p.c. max.	95—100	...
96,410	July 17	4½	4½	Cardiff 4½ p.c. Pref.	92—97	...
55,520	July 31	6	6	Colchester 6 p.c. Pref.	113—118	...
90,550	Mar. 20	5	5	Do. 5 p.c. Deb.	103—108	...
150,000	July 31	4	4	Croydon 4 p.c. Pref.	84—89	...
130,000	June 19	4	4	Do. 4 p.c. Deb.	90—95	...
65,000	Aug. 21	7½	7½	Eastbourne 'A' 5 p.c.	120—130	...
198,000	,,	6	6	Do. 'B' 3½ p.c.	103—113	...
112,312	,,	5	5	Do. 5 p.c. Pref.	100—105	...
130,000	June 19	5	5	Do. 5 p.c. Deb.	105—110	...
130,500	Aug. 10	7½	7½	Exeter New Ord. (£10) ...	13½—15½	...
24,000	Aug. 21	8½	8½	Gt. Yarmouth 8½ p.c. max. (£30)	24—29	...
59,400	,,	7½	7½	Do. 7½ p.c. max. (£30) ...	26—31	...
51,160	June 5	5½	5½	Do. 5½ p.c. Deb.	115—120	...
152,600	Sept. 4	9	8	Guildford Cons.	145—155*	−5
54,055	,,	5	5	Do. 5 p.c. Pref.	100—105*	−2
68,250	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
156,600	Aug. 21	7	7	Hampton Court Cons. ...	100—110	...
86,046	June 19	‡4½	‡5	Holyh'd&N.W.G.&W.Cpn.Ord.	13/6—15/6	...
80,000	Aug. 21	4	4	Lea Bridge 4 p.c. Pref.	78—83	...
60,000	,,	6	6	Do. 6 p.c. Pref.	113—118	...
94,876	June 5	4	4	Do. 4 p.c. Deb.	87—92	...
73,620	Mar. 6	8¾	8¾	Luton Cons. 'A'	150—160	...
107,960	Mar. 20	4	5½	Mid Kent Ord. (£10)	8½—9½	...
230,940	July 31	10	10	Oxford & District Ord. ...	145—155	...
47,112	,,	5	5	Do. 5 p.c. Pref.	95—105	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...
126,193	May 8	7½	7½	Peterborough Ord.	134—139	...
64,990	Mar. 6	7½	7½	Redditch Ord.	115—125	...
166,850	July 31	8	8	Romford Ord.	137—142	...
60,000	,,	4	4	Do. 4 p.c. Pref.	95—100	...
44,000	Mar. 20	5	5	Do. 5 p.c. Deb.	107—112	...
25,570	July 31	5½	5½	Rugby 5½ p.c. Pref.	116—121	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	103—108	...
42,750	June 5	5½	5½	Do. 5½ p.c. Deb.	113—118	...
110,950	Aug. 21	8	8	Ryde Ord.	137—147	...
270,086	Sept. 4	7	7	Slough Ord.	120—130*	...
21,000	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
28,872	May 8	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	16/—18/−	...
28,866	Mar. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	17/—19/−	...
117,228	Aug. 21	7	5	Swindon Cons.	98—103	...
60,425	June 5	5	5	Do. 5 p.c. Deb.	103—108	...
64,380	June 19	5	5	Torquay & Paignton 5 p.c. Pref.	102—107	...
130,000	Aug. 21	8	5	Wakefield Ord.	101—106	...
81,650	,,	5	5	Do. 5 p.c. max.	81—86	...
82,000	July 31	6	6	Weymouth Ord.	101—106	...
273,626	Aug. 21	7	7	Wolverhampton Cons. Ord. ...	126—131	...
98,384	,,	6	6	Do. 6 p.c. Pref.	113—118	...
160,000	June 19	5½	5½	Do. 5½ p.c. Red. Deb. ...	102—107	...
106,490	Aug. 21	5½	5½	Wrexham Ord.	89—94	...
90,000	June 19	5	5	York 5 p.c. Red. Deb.	102—107	...
133,640	July 31	6½	6	Yorktown (Cam.) 5 p.c. Cons.	112—117	...
120,000	,,	5	5	Do. 5 p.c. Pref.	100—105	...
35,000	June 19	5½	5½	Do. 5½ p.c. Deb.	110—115	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 8.	Rise or Fall on Week
347,756	July 31	6	5	Bath Cons.	113—115	...
1,667,250	,,	5	5	Bristol, 5 p.c. max.	106—108	...
120,420	June 5	4	4	Do. 1st 4 p.c. Deb.	96—100	...
415,250	,,	4	4	Do. 2nd 4 p.c. Deb. ...	96—100	...
328,790	,,	5	5	Do. 5 p.c. Deb.	113—116	...
274,000	July 31	5	5	Newport (Mon.) 5 p.c. max. ...	93—95	...
13,200	Sept. 4	8⅝	7	Pontyp'l Gas & W. 10 p.c. 'A'	12⅝—13½*	...
13,600	,,	6	5	Do. 7 p.c. 'B'	10½—11½*	...
40,000	,,	6	5	Do. 7 p.c. 'C'	10½—11½*	...
140,778	July 31	5	5	Weston-super-Mare Cons. ...	102—104	...
64,338	June 19	4	4	Do. 4 p.c. Deb.	97—99	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	146—150	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 8.	Rise or Fall on Week
157,150	July 31	6½	5	Chester 5 p.c. Ord.	105—108	...
92,500	June 5	4	4	Do. 4 p.c. Pref.	94—98	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	86—89	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	96—100	...
2,167,410	Aug. 21	6	6	Liverpool 5 p.c. Ord.	111—113	...
245,500	June 19	5	5	Do. 5 p.c. Red Pref. ...	100—105	...
306,083	July 17	4	4	Do. 4 p.c. Deb.	99—101	...
106,280	July 31	10	10	Preston 'A' 10 p.c.	174—184	...
188,219	,,	7	7	Do. 'B' 7 p.c.	126—136	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 8.	Rise or Fall on Week
122,577	Aug. 21	8	8	Blyth 5 p.c. Ord.	146½—148½	...
732,000	Aug. 21	3	4	Hartlepool G. & W. Cn. & New	74½—76½	...
2,061,315	July 31	5¾	5	Newcastle & Gateshead Con.	20/—21/−a	...
682,856	,,	4	4	Do. 4 p.c. Pref.	85—87	...
776,706	June 5	3½	3½	Do. 3½ p.c. Deb.	83—84	...
277,285	April 24	5	5	Do. 5 p.c. Deb. '43 ...	101—103	...
332,351	Aug. 21	6	6	Sunderland 6 p.c. max. ...	126—128	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations August 31.	Rise or Fall on Week
542,270	Aug. 10	9	6	Derby Con.	130—135	...
55,000	June 19	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	June 19	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	102—107	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Sept. 8.	Rise or Fall on Week
10,000	Aug. 21	10	10	Great Grimsby 'A' Ord. ...	180—190	...
6,500	,,	10	10	Do. 'B' Ord. ...	180—190	...
79,000	,,	10	10	Do. 'C' Ord. ...	175—185	...
1,806,339	Feb. 20	6½	6½	Sheffield Cons.	133—136	...
95,000	July 3	4	4	Do. 4 p.c. Deb.	99—101	...

a The quotation is per £1 of Stock.
* Ex. div. ‡ For year.

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